

REMARKS

This application has been carefully reviewed in light of the Office Action dated June 18, 2004. Claims 39-51 are pending. Applicants respectfully request reconsideration of the above-referenced application in light of the following remarks and August 24, 2004 telephonic conference with the Examiner.

Applicants' undersigned representative acknowledges with appreciation the telephonic conference conducted with the Examiner on August 24, 2004. In the telephonic conference, Applicants' undersigned representative pointed out that on January 12, 2004, a Notice of Allowance was issued by the Examiner allowing claims 39-51. Subsequently, Applicants filed an RCE requesting that the Examiner consider additional references submitted in an IDS filed on February 6, 2004.

Applicants' undersigned representative noted to the Examiner that the Office Action dated June 18, 2004, did not cite any of the new references submitted by the Applicants; but, cited the same references that were used prior to the issuance of the Notice of Allowance. As a result, Applicants' undersigned representative indicated to the Examiner that claims 39-51 should still be in condition for allowance since none of the new references submitted in the February 6, 2004 IDS were cited. The Examiner agreed that if the references were the same as the ones used prior to issuance of the Notice of Allowance, that claims 39-51 should still be in condition for allowance.

Moreover, Applicants' undersigned representative pointed out to the Examiner that the 35 U.S.C. § 103(a) rejection for claims 48 and 51 is improper. In particular, the cited prior art reference Sandhu et al., U.S. Patent No.: 6,303,956 B1 was commonly owned, and thus, is an improper reference for purposes of a 35 U.S.C. § 103(a) rejection. This same rejection was made in the April 24, 2003 Office Action and responded to in Applicants' Amendment filed on October 14, 2003. Specifically,

Applicants filed a Statement of Common Ownership on October 14, 2003.

The Examiner acknowledged receipt of the Statement of Common Ownership filed on October 14, 2003. As the Applicants' undersigned representative indicated to the Examiner in the August 24, 2004 telephonic conference, the Statement of Common Ownership stated that the above-referenced U.S. Patent Application No.: 09/653,411 and Sandhu et al., U.S. Patent No.: 6,303,956 B1 were, at the same time the invention of U.S. Patent Application No.: 09/653,411 was made, owned by Micron Technology, Inc. The Examiner also agreed that Sandhu is an improper §103(a) reference.

The Examiner requested that this summary of the telephonic conference be included with Applicants' response to the June 18, 2004 Office Action. For at least the reasons discussed above with the Examiner, Applicants respectfully submit that claims 39-51 are in immediate condition for allowance in light of the Examiner's statements.

In a more specific response to the June 18, 2004 Office Action, the following remarks are provided below.

Claims 39-47 and 49-50 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lee. The rejection is respectfully traversed.

The Office Action asserts that "Lee et al discloses on figure 5 a semiconductor device comprising a substrate 31 and at least one electron mechanically polished metal layer 53 formed over said substrate 31." (Office Action, pg. 2). Applicants respectfully disagree. There is no support for the Office Action's contention because Lee does not disclose, teach or suggest an "electro-mechanically polished metal layer," as recited in claims 39, 43 and 49-50.

Lee discloses forming a diffusion barrier layer 37 in contact with a first conductive layer 39. See paragraph 38 and Fig. 5. A second conductive layer 53, used as the lower electrode of the capacitor, is formed on the first conductive film pattern 39. See paragraph 38 and Fig. 5. "The second conductive film pattern 53 used as the lower electrode is not formed by a dry etching process but by a CMP (chemical mechanical polishing) method or an etch-back method." (Paragraph 40) (emphasis added). Accordingly, Lee does not teach Applicants' structure since Lee merely teaches a conventional way of polishing a metal film.

The Office Action further asserts "that the term 'electro-mechanical polished' merely recites product by process and does not structurally distinguish the metal layer from the structure taught be Lee et al." (Office Action, pg. 3). Applicants respectfully disagree. Applicants' structure is significantly different from a conventionally formed metal film, as taught in Lee, as a result of the particular electro-chemical mechanical polishing process utilized. Applicant's specification provides further proof of the structural differences.

In the specification of the present Application, Applicants disclose that "[t]he use of platinum . . . poses significant problems. One problem arises from the difficulty of etching and/or polishing platinum. . . [n]oble metals such as platinum, however, are not highly reactive with conventional chemical etchants." (Applicants' specification, pg. 2, lines 12-19) (emphasis added). Thus, Lee merely teaches a conventionally formed metal layer using conventional chemical etchants and not Applicants' claimed electro-mechanically polished metal layer.

Applicants disclose that "[t]he surface of the metal layer outside the container structure is electro-mechanically polished against a second surface while submersed in an electrolytic bath." (Applicants' specification, pg. 4, lines 11-12). Thus, "[i]n

electropolishing, as the current is being applied, the metallic material reacts with the electrolytes from the electrolytic bath to form an anodic film . . . The anodic film is removed through chemical complexing reactions or mechanical force.” (Applicants’ specification, pg. 11, lines 18-22). As a result, claims 39, 43, 49 and 50 recite structural limitations of the metal film resulting from the particular electro-polishing technique Applicants disclose, and which cannot be adequately described in any other manner.

Further, “[t]he structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product.” M.P.E.P. § 2113 (emphasis added).

Moreover, the literature of record demonstrates that CMP and EMP are entirely different processes resulting in significant structural differences. In “Electrochemical Planarization for Multi-Level Metallization of Microcircuitry,” Circuitree, by Anthony F. Bernhardt et al., October 1995, pp. 38-48, disclosed in Applicants’ IDS filed on December 14, 2000, the reference states that “CMP has a tendency to dish down into the center of wide metal features, as well as causing scratching and smearing of soft metals.” (Page 40, Col. 3) (emphasis added). An EMP metal layer will not have the detrimental scratching and smearing associated with a CMP metal layer (See Declaration of Whonchee Lee). This is a structural difference. This fact is underscored since Applicants’ EMP processed metal layer does not experience the scratching and smearing as a CMP processed metal layer with the presence of the anodic film during the electropolishing process.

As a result, claims 39, 43, 49 and 50 recite structural limitations of the metal layer resulting from the particular electropolishing process, which cannot be adequately described in any other manner. Specifically, Claims 39, 43 and 49-50 recite limitations that distinctly claim the product for which protection is sought: an electro-mechanically polished layer that “has been electro-mechanically polished against a second surface while submersed in an electrolytic bath,” as recited in claims 39, 43, 49 and 50. Submersing the metal layer in an electrolytic bath allows the formation of the anodic film that protects the surface of the metal layer from scratches and smearing.

For at least these reasons, dependent claims 40-42 which incorporate all of the limitations of independent claim 39, and dependent claims 44-47 which incorporate all of the limitations of claim 43, are neither anticipated by nor rendered obvious over Lee.

Withdrawal of the § 102(b) rejection of claims 39-47 and 49-50 is respectfully solicited.

Claims 48 and 51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Sandhu. Reconsideration is respectfully requested.

At the outset, Applicants respectfully submit that 35 U.S.C. § 103(c) disqualifies Sandhu from being used in a 35 U.S.C. § 103(a) rejection in the present application. See M.P.E.P. § 706.02(l)(1). “In order to be disqualified as prior art under 35 U.S.C. § 103(c), the subject matter which would otherwise be prior art to the claimed invention and the claimed invention must be commonly owned at the time the claimed invention was made.” M.P.E.P. § 706.02(l)(2). As indicated above, Applicants previously submitted a “Statement of Common Ownership,” filed October 14, 2003, that provided sufficient evidence to disqualify the Sandhu patent from being used in a 35 U.S.C. § 103(a) rejection. See M.P.E.P. § 706(l)(2) “Evidence Required to Establish

Common Ownership.” Accordingly, Applicants respectfully request that all 35 U.S.C. § 103(a) rejections based on Sandhu be withdrawn.

Moreover, the remarks provided above with regard to the rejection of claims 39-47 and 49-50 in view of Lee are equally applicable here. Specifically, electro-mechanically polished metal layers are structurally distinct from Lee’s metal layer 53. Moreover, Lee does not teach or suggest an EMP metal layer that has been electro-mechanically polished against a second surface while submersed in an electrolytic bath. Sandhu is relied upon as disclosing a memory device electrically coupled to a processor and adds nothing of significance to the issue of EMP formed layers. Accordingly, withdrawal of the § 103(a) rejection with regard to claims 48 and 51 is respectfully solicited.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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